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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/715,775	11/17/2000	Sun-Chueh Kao	2000U034.US	7030

25959 7590 03/09/2005

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EXAMINER

LEE, RIPA

ART UNIT	PAPER NUMBER
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1713

DATE MAILED: 03/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 09/715,775	Applicant(s) KAO ET AL.	
	Examiner Rip A. Lee	Art Unit 1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on May 7, 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 23-34, 37-48, and 51-55 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 23-34, 37-48, and 51-55 is/are rejected.
- 7) ☒ Claim(s) 29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action follows a request for continued examination (RCE) under 37 § C.F.R. 1.114, filed on May 7, 2004. Applicants have amended claims 23, 29, 40, 54, and 55. Claims 23-34, 37-48, and 51-55 remain for prosecution.

Claim Objections

1. Claim 29 is objected to because of the following informalities: The recitation “prior to...composition” is redundant and may be deleted. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. Claims 23-34, 37-48, and 51-55 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The exemplary term, “preferably,” in claims 23 and 40 renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d). Since claims 24-34, 37-39, 41-48, and 51-55 depend from independent claims 23 and 40, they are subsumed under the rejection.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 24-26, 28, 30, 33, 37, and 39 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,834,393 to Jacobsen *et al.*

Present claim 23 is drawn to a process for polymerizing olefins comprising: (a) preparing a catalyst composition by (i) combining a catalyst compound and supported alumoxane (formed by contact of inorganic oxide and alumoxane) and (ii) combining an ionizing activator, and (b) contacting the catalyst composition with olefin(s) under polymerization conditions.

Jacobsen *et al.* teaches the claimed process: (a) Example 2E (col. 30, lines 24-35) teaches treatment of silica with MAO/toluene to form a supported alumoxane. Example 17 describes the remaining steps of the procedure (see col. 32, lines 36-44); (i) the treated support of example 2E was slurried in toluene, and 10 mmole of catalyst compound, MCpTi, in IsoparTM E was added, and the mixture was stirred for 15 minutes; (ii) this mixture was then combined with an ionizing activator [Et₃NH][B(C₆F₅)₃(C₆H₄OH)]; (note that the ionizing activator conforms to the claimed general formula (L'-H)_d⁺(A^{d-}) recited in the present claims; specifically, (L'-H)_d⁺ is selected from the group of ammoniums, preferably ammoniums of triethylamine; the counteranion [B(C₆F₅)₃(C₆H₄OH)] is sufficiently noncoordinating due to the presence of highly electrophilic perfluorophenyl

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groups); (b) finally, the catalyst was contacted with olefin resulting in the formation of polymer (Example 27, see Table, entry 17). In conclusion, the subject matter of present claim 23 is taught precisely by the prior art of Jacobsen *et al.*

Claims 24-26, 28, 30, 33, 37, and 39 are drawn to meaningful developments of the present invention. The subject matter of claims 24-26 is anticipated by the prior art because contact of supported catalyst compound and ionizing activator (*i.e.*, step (ii)) takes place for 16 hours (col. 32, line 42). Since toluene, a hydrocarbon solvent, is used in step (i), present claim 28 is also anticipated. With respect to claim 30, Jacobsen *et al.* teaches in Example 17 that step (ii) involves contact of the ionizing activator in toluene (col. 32, line 41). The catalyst compound, designated MCpTi is the metallocene (*t*-BuN)(Me₂Si)(Me₄C₄)TiMe₂ (col. 31, line 5), and thus, claim 33 is also anticipated by the prior art. The subject matter of claims 37 and 39 is also disclosed in Jacobsen *et al.* Although the mole ratio of activator to catalyst is 4:1 in the cited example, the reference teaches that the range 0.5:1 to 20:1 is acceptable (col. 17, line 60). The supported catalysts are well suited for gas phase polymerization processes, as discussed in col. 23, lines 8-56.

5. Claims 40-42, 44, 47, 51, and 53 are rejected under 35 U.S.C. 102(b) as being anticipated by Jacobsen *et al.*

Present claim 40 differs from present claim 23 in that the catalyst composition is prepared by combining a catalyst compound, a supported alumoxane, and an ionizing activator wherein the components are contacted for at least 1 min prior to contacting with olefins for polymerization. In this case, there is no specified order of assembly of components. As discussed in the previous paragraph, Jacobsen *et al.* teaches the process

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recited in present claim 23 and it also teaches that materials are contacted for at least 1 min (the subject matter of claims 24-26 was anticipated by the prior art). It follows that the process recited in present claim 40 is also anticipated by the reference. Claims 41, 42, 44, 47, 51, and 53 recite the same limitations of corresponding claims 25, 26, 28, 33, 37, and 39, respectively. Therefore, these claims are also anticipated by the prior art.

6. Claims 40-42, 44, 47, 51, 53, and 55 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,801,113 to Jejelowo *et al.*

Example B in Jejelowo *et al.* teaches a process of preparing a catalyst by combining 0.2 g (0.45 mmole) of metallocene $\text{Me}_2\text{Si}(\text{NC}_{12}\text{H}_{23})(\text{C}_5\text{Me}_4)\text{TiMe}_2$ with 0.333 g (0.42 mmole) of ionizing activator $[\text{PhNMe}_2\text{H}][\text{B}(\text{C}_6\text{F}_5)_4]$ in toluene for 1 hr, and combining this with a suspension of silica which had been pretreated for 1 hr with methylalumoxane. The resulting mixture was stirred for an additional 12 hr. The resulting material was an active polymerization catalyst. A mixture of ethylene and 1-butene was polymerized in the presence of the supported catalyst. The mole ratio of activator to metal is about 1:1. Since the present claims do not recite a specified order of assembly of components, the subject matter of the present claims is anticipated entirely by Jejelowo *et al.*

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 23-26, 28, 30, 33, 37, and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,801,113 to Jejelowo *et al.*

The discussion of the disclosures of the prior art from paragraph 6 of this office action is incorporated here by reference. The cited example does not show the process recited in the present claims in which a catalyst compound is combined with supported alumoxane, followed by combining the resulting material with ionizing activator.

According to the inventors, the assembly of the catalyst is not limited to that shown in the working example of the patent. In fact, several manipulative features are presented in col. 17, lines 28-54. Options (3) and (5) describe the working example in which ionic activator and transition metal component are contacted prior to contact with pretreated carrier. However, the carrier can be pretreated with an organometallic compound followed by addition of the transition metal component and the activator in any order, as indicated in

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option (9). Thus, it would have been obvious to one having ordinary skill to modify the steps of example B by first combining catalyst compound $\text{Me}_2\text{Si}(\text{NC}_{12}\text{H}_{23})(\text{C}_5\text{Me}_4)\text{TiMe}_2$ with a suspension of silica/MAO, followed by adding the remaining component, the ionizing activator, $[\text{PhNMe}_2\text{H}][\text{B}(\text{C}_6\text{F}_5)_4]$, and thereby arrive at the process of present claim 23. This permutation is obvious because such a sequence is presented in the description of the invention of the prior art. The subject matter of remaining the claims is obvious over the prior art because they are disclosed adequately, as elucidated in paragraph 6 (*vide supra*). Components are contacted for longer than 1 hr, the reactions take place in hydrocarbon solvents, and the mole ratio of activator to transition metal component is approximately 1:1.

10. Claims 27, 29, 38, 43, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobsen *et al.* in view of U.S. Patent No. 5,674,795 to Wasserman *et al.*

Jacobesen *et al.* discusses use of hydrocarbon solvents in general, but it does not teach use of diluents having a flash point greater than 200 °F, as recited in the present claims. However, it is noted that the catalyst in Jacobsen *et al.* is amenable to gas phase polymerization processes which require elevated temperatures. Wasserman *et al.* shows that Kaydol,[®] which is a mineral oil having a flash point greater than 200 °F, is well suited for gas phase polymerization reactions. The skilled artisan, having read both patents, would have found it obvious to use mineral oil as the solvent in the process shown in Jacobsen *et al.*, and since the solvent is inert, the skilled artisan would have expected such an embodiment to work without impairing catalyst activity.

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11. Claims 31, 32, 45, and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobsen *et al.* or Jejelowo *et al.* in view of U.S. Patent No. 6,066,703 to Reichle *et al.*

Neither of the primary references teaches combining the catalyst with a cycloalkadiene compound. Reichle *et al.*, however, shows that addition of cycloalkadienes such as cyclopentadiene, indene, fluorene and its derivatives (see Tables I-V, examples 1-48) to a catalyst composition is beneficial for enhancing catalyst activity. Therefore, one having skill in the art would have found it obvious to add cycloalkadienes of Reichle *et al.* to the catalyst of Jacobsen *et al.* or Jejelowo *et al.* in order to arrive at the present claims. Since this process is shown to work in the prior art, one would expect the modified catalyst of Jacobsen *et al.* or of Jejelowo *et al.* to exhibit enhanced activity as well, thereby providing the requisite motivation for combining references. *In re O'Farrell*, 7 USPQ 2d 1673 (Fed. Cir. 1988).

12. Although rejected under 35 U.S.C. 112, 2nd paragraph, the general subject matter of claims 34 and 48 appears to be allowable. The claims are drawn to use of transition metal complexes based on bidentate ligands containing pyridine or quinoline moieties. To date, the closest art is U.S. Patent No. 6,103,657 to Murray and U.S. Patent No. 6,184,171 to Shih. Both references disclose supported catalysts containing the metal complexes described in the claims, but the references do not teach exactly the claimed processes described in the claims.

Response to Arguments

13. Applicants traverse the rejection of claims under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,834,393 to Jacobsen *et al.* Applicants arguments have been considered fully, but they are not persuasive. In particular, it is submitted that the process of the present claims is not taught by the prior art because the ionizing activator of Jacobsen *et al.* differs from that disclosed in the present invention. Although Jacobsen *et al.* does not teach the ionizing activators of dependent claim 54, the disclosed activator does satisfy the minimum structural parameters set forth in present claim 23. As such, the claims remain anticipated by the prior art. Consequently, the rejection has not been withdrawn.

14. The rejection of claims under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,143,685 to Llinas *et al.* has been withdrawn by the examiner in view of new rejections using U.S. Patent No. 5,801,113 to Jejelowo *et al.*

15. Applicants traverse the rejection of claims under 35 U.S.C. 103(a) as being unpatentable over Jacobsen *et al.* in view of Wasserman *et al.* Applicants indicate that it could not have been deduced from Wasserman *et al.* that the order of addition of various specific components would enhance activity, especially in light of the fact that the reference does not disclose the order of addition of components. It is noted that the secondary reference was relied upon to address use of mineral oil as diluent for polymerization reactions. To date, there is no indication as to why the combination of references is not obvious to one of ordinary skill in the art. Consequently, the rejection has not been withdrawn

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16. Applicants traverse the rejection of claims under 35 U.S.C. 103(a) as being unpatentable over Jacobsen *et al.* in view of Reichle *et al.* Applicants indicate that the examples of the present invention are surprising and that Reichle *et al.* does not disclose the order of addition of components. It is noted that the secondary reference was relied upon to address use of cycloalkadienes to enhance catalyst activity in general. To date, there is no indication as to why the combination of references is not obvious to one of ordinary skill in the art. Consequently, the rejection has not been withdrawn.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rip A. Lee whose telephone number is (571)272-1104. The examiner can be reached on Monday through Friday from 9:00 AM - 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached at (571)272-1114. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on the access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).



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March 3, 2005